

CLAIMS

1. A navigation information system for providing information to a mobile user dependent on the location of the mobile user, the system comprising a mobile communications system having a fixed part and one or more mobile units for communicating with the fixed part, each mobile unit including means for transmitting to the fixed part a request for guidance information relating to a destination specified by the user of the mobile unit, and for receiving such guidance information from the fixed part, and the fixed part including:

means for determining the location of a mobile unit requesting guidance information,

means for generating guidance information according to the present location and specified destination of the mobile unit, and

means for transmitting the guidance information so generated to the mobile unit,

whereby information dependent on the location and specified destination of the mobile unit can be transmitted to the mobile unit.

2. A system as claimed in Claim 1, the fixed part including means for determining the location of the mobile part in relation to a geographical overlay comprising a plurality of overlay areas, and means for transmitting information associated with an overlay area which includes the location of the mobile part, whereby a mobile part within that overlay area receives information associated with that overlay area.

3. A system as claimed in Claim 2, including means for storing a digital representation of the geographical overlay, and means for modifying the stored representation such that the configurations of the overlay areas may be selected to meet changing requirements.

4. A system according to Claim 2 or 3, including means for determining when a mobile part enters a predetermined overlay area, and means for transmitting a message to the mobile part in response to the mobile part entering the predetermined overlay area.

A 5. A system according to Claim 2, ~~3, or 4~~ including means for determining when a mobile part enters a predetermined overlay area, and means for transmitting a message, to a user other than the said mobile part, in response to 5 the said mobile part entering the predetermined overlay area.

6. A system according to claim ~~4 or 5~~, including means to store a value associated with the mobile part, and means arranged to modify the stored value in response to the message.

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A 7. A system as claimed in ~~any preceding claim~~, having means for locating the position of the mobile part by radio location

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8. A system as claimed in Claim 7, wherein the means for locating position 15 comprises a satellite navigation system receiver and/or means for identifying the location of the mobile part in relation to elements of the fixed part of the communications system.

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A 9. A system as claimed in ~~any preceding claim~~, wherein the means for determining the location of the mobile part comprises means to interrogate a location-identifying means forming part of the mobile part.

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10. A system as claimed in claim 9, wherein the fixed part has means to determine the approximate location of the mobile part, and wherein the location identifying means of the mobile part is arranged to respond to a location request from the interrogation means with a non-unique location signal which, in combination with the approximate location determined by the fixed part, determines a unique location.

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A 11. A system as claimed in ~~any preceding claim~~, wherein the mobile part has means for locating its position by dead reckoning

A 12. A system as claimed in ^{claim 1} ~~any preceding claim~~, the fixed part including means for generating and maintaining guidance data based on vehicle movement data derived from time information and position measurements of a plurality of the mobile parts and/or estimations of future locations of the mobile parts based on 5 the guidance information previously transmitted to the mobile parts.

A 13. A system according to ^{claim 1} ~~any preceding claim~~ wherein the fixed part comprises means for transmitting to the mobile part an expected range of movement information and for receiving from the mobile part movement measurements 10 outside the expected range, and the mobile part comprises means for measuring location and time to derive movement information, means to compare the movement information with the expected range received from a fixed part of the system, and means to automatically report to the fixed system movement measurements outside the expected range.

15 A 14. A system according to ^{claim 1} ~~any preceding claim~~, the fixed part including means for storing guidance data, means for updating the stored guidance data, means for identifying mobile parts to which the updated data are applicable, and means for transmitting such data over the communications system to the mobile parts so 20 identified.

A 15. A system according to ^{claim 1} ~~any preceding claim~~, wherein the mobile part includes guidance instruction means controllable by instructions contained in the guidance information transmitted from the fixed part over the communications link, 25 whereby guidance instructions can be communicated to the user by means of the guidance instruction means.

16. A system according to ^{claim 1} ~~any preceding claim~~, wherein the fixed part has 30 input means operable by a human operator to input guidance instruction requests to the fixed part.

17. A navigation information system for providing information to one or more mobile users dependent on their locations, the system comprising:

means for determining the location of a mobile unit requesting guidance information relating to a specified destination,

5 means for generating information for guidance of the user of the mobile unit according to the present location and specified destination of the mobile unit,

and a communications system for transmitting the guidance information so generated to the mobile unit,

whereby guidance information dependent on the present location and
10 specified destination of the mobile unit can be transmitted to the mobile unit.

18. A system as claimed in Claim 17, including means for determining the location of a mobile unit in relation to a geographical overlay comprising a plurality of overlay areas, and means for transmitting information associated with an

15 overlay area which includes the location of the mobile unit, whereby a mobile part within that overlay area receives information associated with that overlay area.

19. A system as claimed in Claim 18, including means for storing a digital representation of the geographical overlay, and means for modifying the stored

20 representation such that the configurations of the overlay areas may be selected to meet changing requirements.

20. A system according to Claim 18 or 19, including means for determining when a mobile unit enters a predetermined overlay area, and means for

25 transmitting a message to the mobile unit in response to the mobile unit entering the predetermined overlay area.

A 21. A system according to Claim 18, 19, or 20 including means for determining when a mobile unit enters a predetermined overlay area, and means

30 for transmitting a message, to a user other than the said mobile unit, in response to the said mobile unit entering the predetermined overlay area.

A 22. A system according to claim 20 or 21, including means to store a value associated with the mobile unit, and means arranged to modify the stored value in response to the message.

A 5 23. A system as claimed in ~~any of claims 17 to 22~~, the means for determining the location of a mobile unit comprising means to interrogate a location-identifying means of a co-operating mobile unit to determine its position..

A 10 24. A system as claimed in ~~any of claims 17 to 23~~, wherein the means for locating position comprises means for identifying the location of the mobile unit in relation to elements of the fixed part of the communications system.

25. A system as claimed in claim 24, wherein the means for locating position comprises means to determine the approximate location of the mobile unit, means 15 to receive a non-unique location signal from the mobile unit, and means to combine the approximate location information with the non-unique location information to determine a unique location.

A 20 26. A system as claimed in ~~any of claims 17 to 25~~, including means for generating and maintaining guidance data based on vehicle movement data derived from time information and position measurements of a plurality of the mobile parts

A 25 27. A system according to ~~any of claims 17 to 26~~, having means for transmitting to the mobile part an expected range of movement information, and for receiving from the mobile part movement measurements outside the expected range.

A 30 28. A system according to ~~any of claims 17 to 27~~, including means for storing guidance data, means for updating the stored guidance data, means for identifying mobile units to which the updated data are applicable, and means for transmitting such data over the communications system to the mobile units so identified.

claim 17

A 29. A system as claimed in any of claims 17 to 28, having input means operable by a human operator to input guidance instruction requests.

30. A mobile unit for a navigation information system, comprising means for identifying the present position of the mobile unit, means for transmitting, over a communications link, a request for guidance to a specified destination, and guidance instruction means controllable by guidance instruction information received over the communications link, whereby guidance instructions between the present location and the specified location can be communicated to a user by means of the guidance instruction means.

31. A mobile unit according to claim 30, comprising means for measuring the location of the mobile unit, and time, to derive movement information, means to compare the movement information with an expected range received from a fixed part of the system, and means to automatically report to the fixed system movement measurements outside the expected range.

32. A method of providing navigation guidance information to mobile units of a mobile radio system, the information being dependent on the locations of the mobile units, the method comprising the steps of:
- transmitting, from a mobile unit to the fixed part, a request for navigation guidance to a specified destination;
- determining the location of the mobile unit;
- generating guidance information on the basis of the location information, the requested destination, and navigation data stored in the fixed part; and
- transmitting the guidance information from the fixed part to the mobile unit;
whereby guidance information relevant to the present location and specified destination of the mobile unit is transmitted to the mobile unit.

30 33. A method as claimed in Claim 32, wherein the location of the mobile unit is determined in relation to a geographical overlay comprising a plurality of overlay areas, generating information associated with an overlay area which includes the location of the mobile part, and transmitting the information associated with the

relevant overlay area to the mobile part, whereby a mobile part within that overlay area receives information associated with that overlay area.

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34. A method as claimed in claim 33, including the step of storing a digital representation of the geographical overlay, and modifying the stored representation such that the configurations of the overlay areas may be selected to meet changing requirements.

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35. A method according to Claim 33 or 34, comprising the further steps of determining when a mobile unit enters a predetermined overlay area, and transmitting a message to the mobile unit in response to the mobile unit entering the predetermined overlay area.

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36. A method according to Claim 33, 34, or 35 including the further steps of determining when a mobile unit enters a predetermined overlay area, and transmitting a message to a user other than the said mobile unit in response to the mobile unit entering the predetermined overlay area.

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37. A method according to claim 35 or 36 including the further step of modifying a stored value associated with the mobile unit in response to the message.

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38. A method as claimed in ~~any of claims 32 to 37~~, wherein the position of the mobile unit is identified by a radio location method.

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39. A method as claimed in Claim 38, wherein the position of the mobile unit is determined by means of a satellite navigation system and/or by identifying the location of the mobile part in relation to elements of the fixed part of the communications system.

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40. A method according to ~~any of claims 32 to 39~~, wherein the fixed unit interrogates the mobile unit to identify its location.

41. A method as claimed in claim 40 wherein the fixed part determines the approximate location of the mobile part, and wherein the mobile part responds to a location request from the interrogation means with a non-unique location signal which, in combination with the approximate location determined by the fixed part, 5 determines a unique location.

claim 32

A 42. A method as claimed in ~~any of claims 32 to 41~~, wherein the mobile unit identifies its position by dead reckoning.

claim 32

A 10 43. A method according to ~~any of Claims 32 to 42~~, including the steps of generating and maintaining data based on vehicle movement data derived from time information and position measurements of a plurality of the mobile parts and/or estimations of future locations of the mobile parts based on the guidance information previously transmitted to the mobile parts.

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A 44. A method according to ~~any of claims 32 to 43~~ wherein the fixed part transmits to the mobile part an ~~expected~~ range of movement information, and the mobile part measures location and time to derive movement information, compares the movement information with the ~~expected~~ range received from the fixed part of 20 the system, and reports to the fixed system movement measurements outside the expected range.

claim 32

A 45. A method as claimed in ~~any of Claims 32 to 44~~ including the further steps of the updating the stored data, identifying the mobile units to which the updated 25 data are applicable, and transmitting such data over the communications system to said applicable mobile parts.

claim 32

A 46. A method as claimed in ~~any of claims 32 to 45~~, wherein the guidance information transmitted to the mobile unit controls guidance instruction means 30 forming part of the mobile unit, whereby guidance instructions can be communicated to the user of the mobile unit.

47. Apparatus substantially as described with reference to the accompanying drawings

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48. A method substantially as described with reference to the accompanying drawings

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